

Figure 1A
Identification of Functional Allele Families:
Motivation

◆ Repetitive Gene Systems

- Repetitive Biochemical Functions
- E.g. systems 1, 7

◆ Both systems must be inactivated
before problems

- E.g. ((1A₂ or 1B₃) and (7A₃ or 7C₁))
- Automatic choice of allele
combinations required

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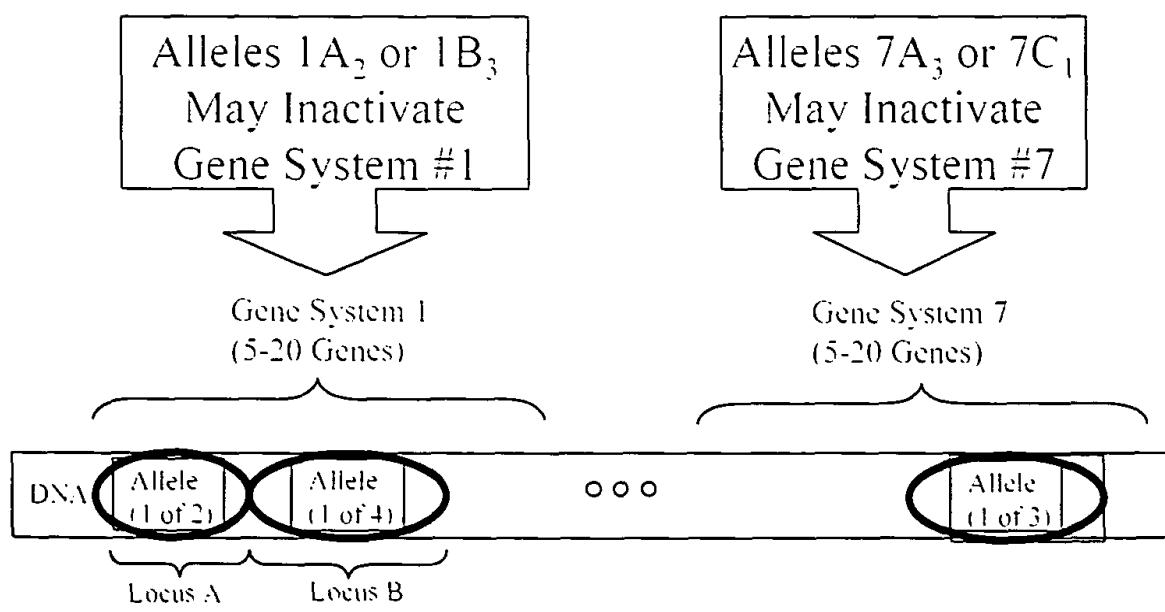


Figure 1B
Method of Identifying Clinically Relevant
Allele Combinations

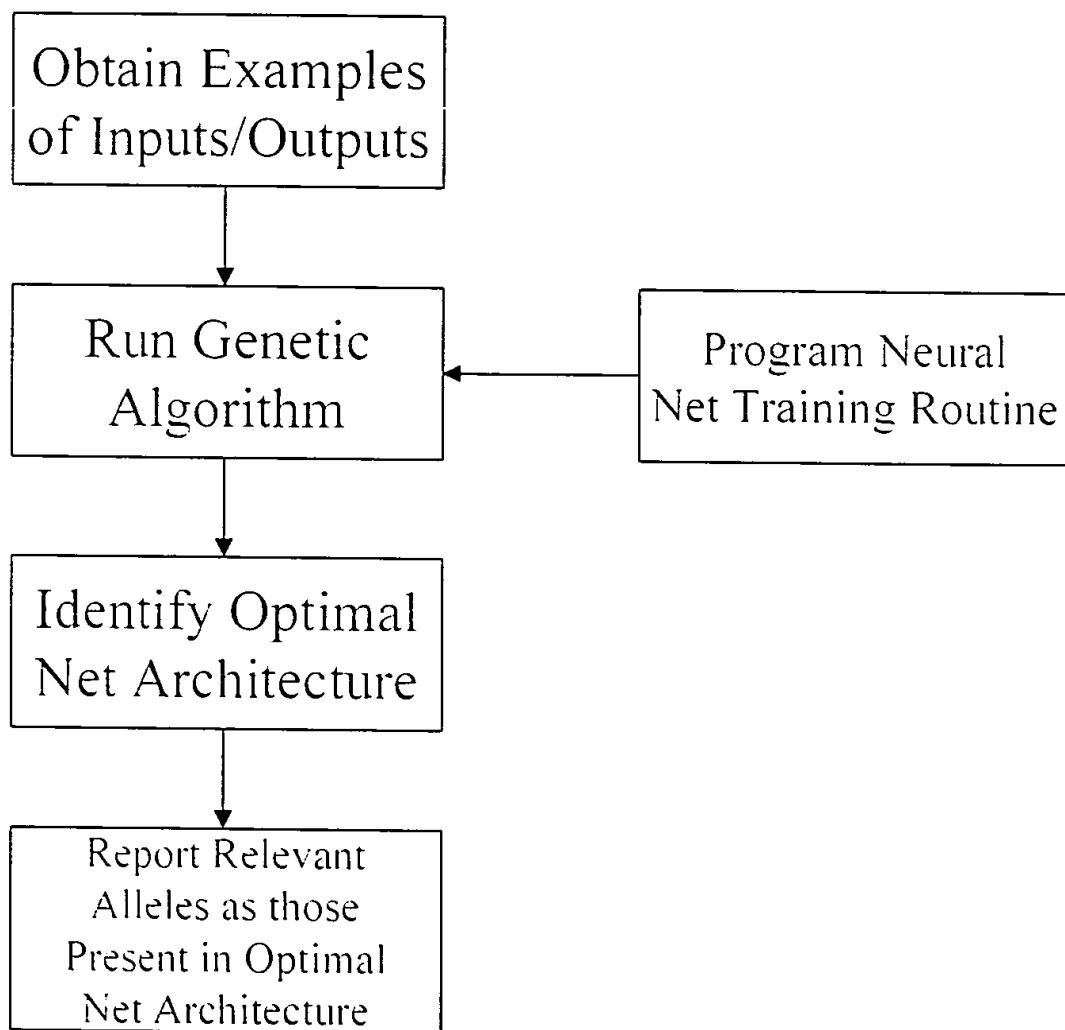


Figure 1C
Structure of Neural Network
Training Routine

EE-559 - DEEP LEARNING

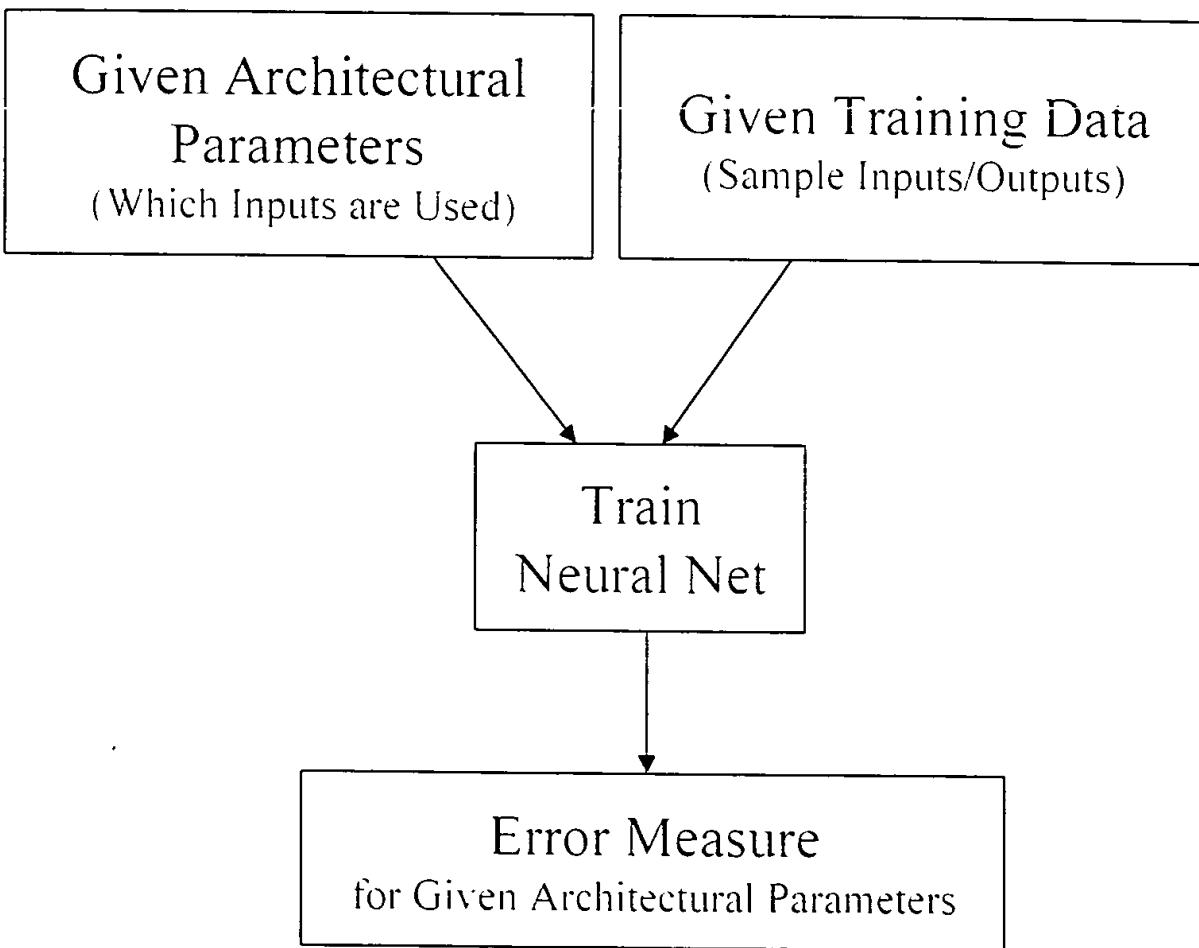


Figure 1D:
Typical Mapping Neural Network

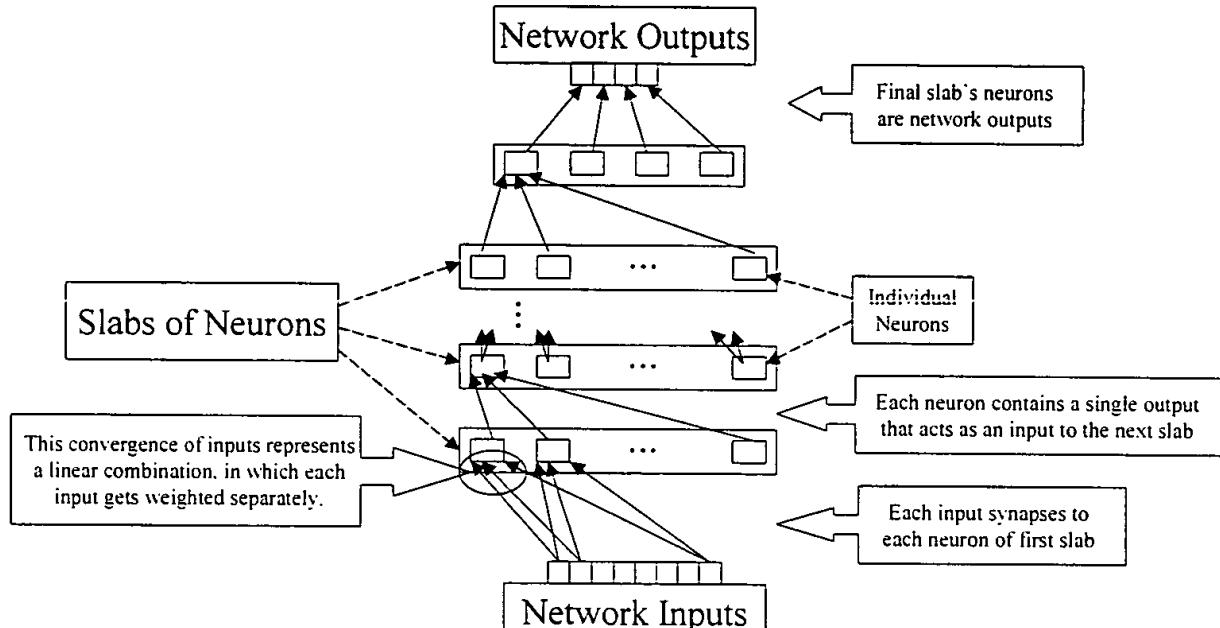


Figure 1E: Typical Genetic Algorithm

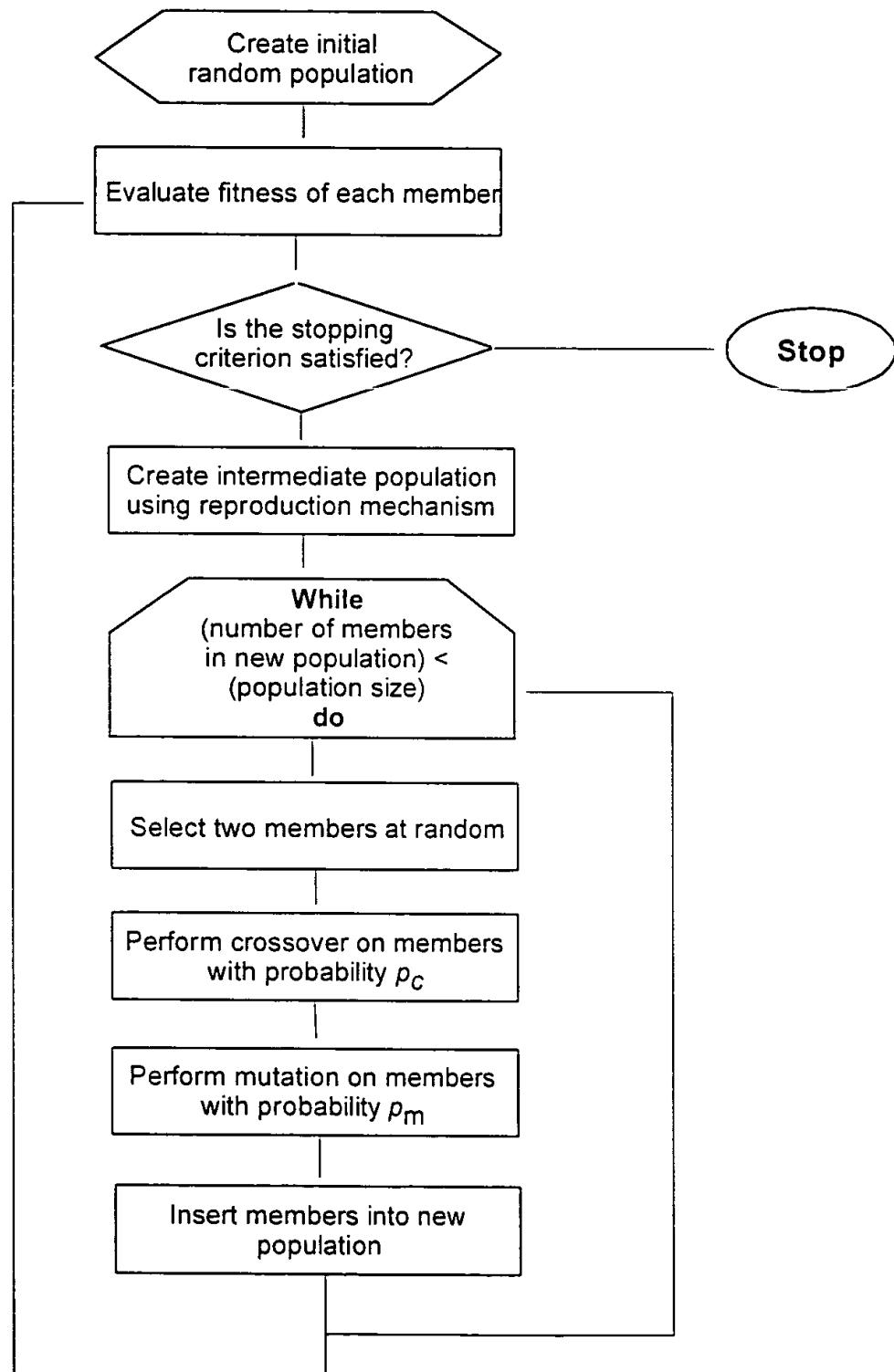


Figure 2
Method of Predicting Clinical Variables
Given Genomic Data

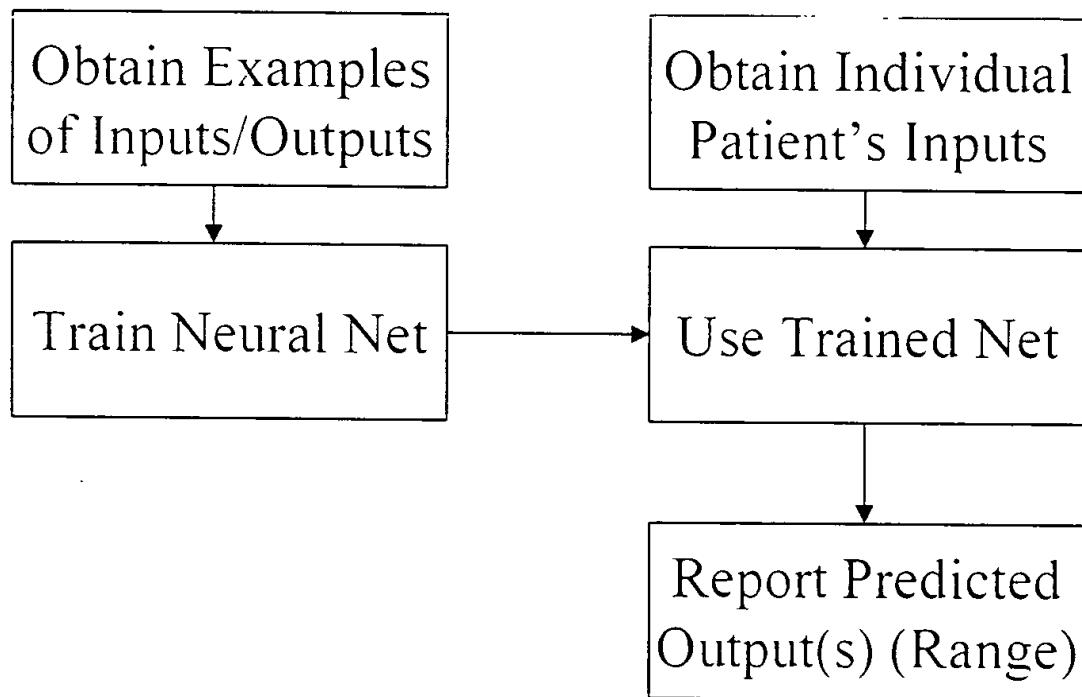


Figure 3
Genomic Methods of Screening Patients for
Clinical Drug Use

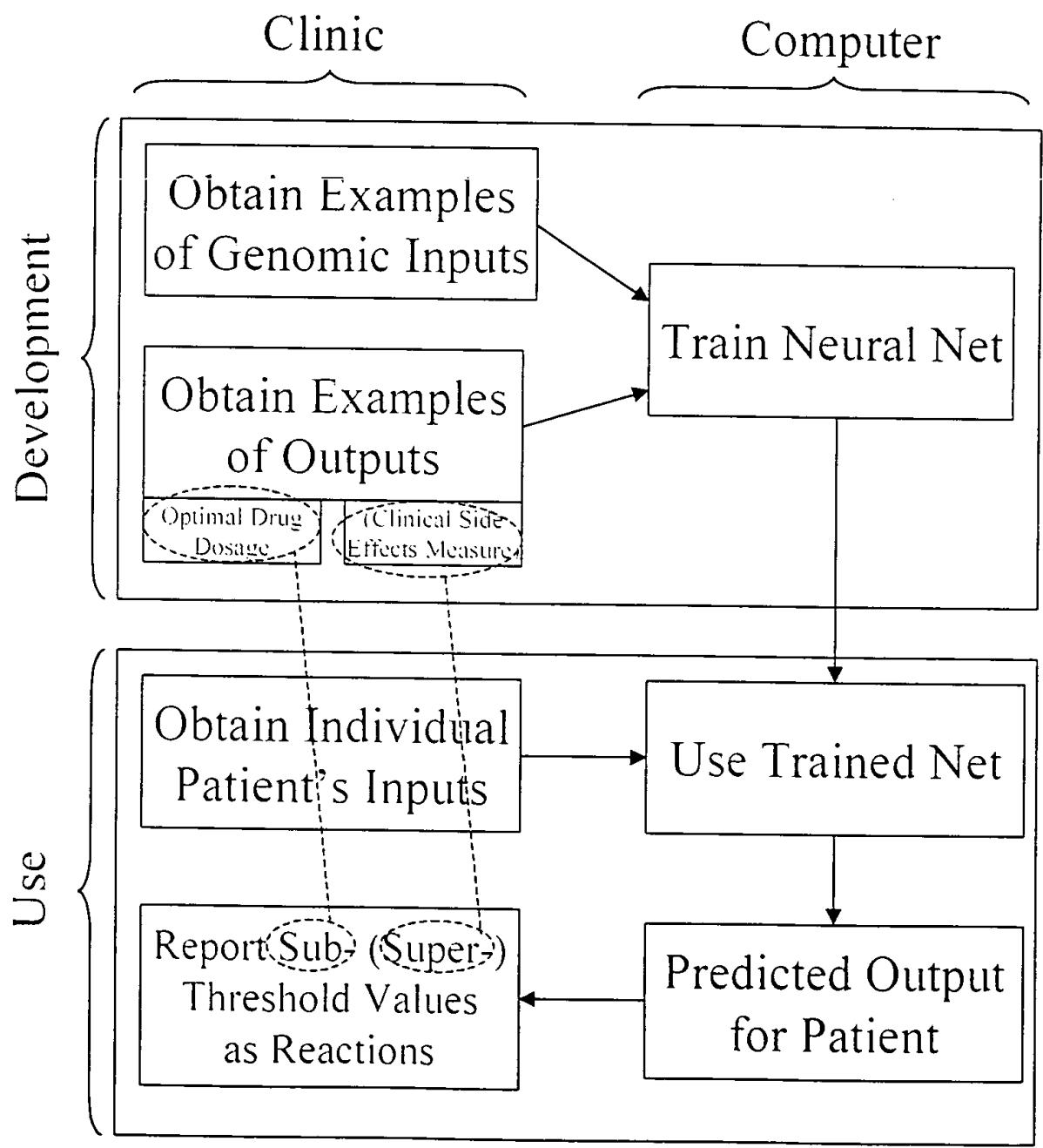


Figure 4A
GA Rolling: Illustration of Infeasible Initial
Mapping Problem

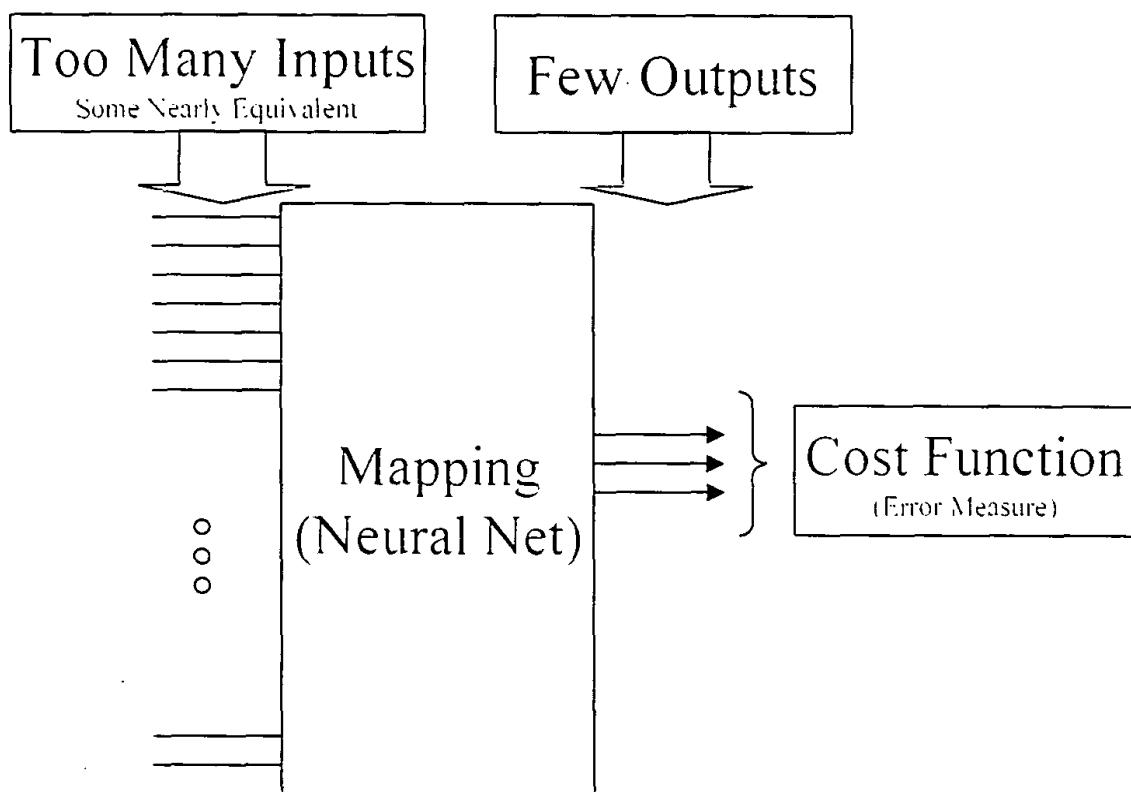


Figure 4B
GA Rolling: Illustration of Individual
Category and its Genes

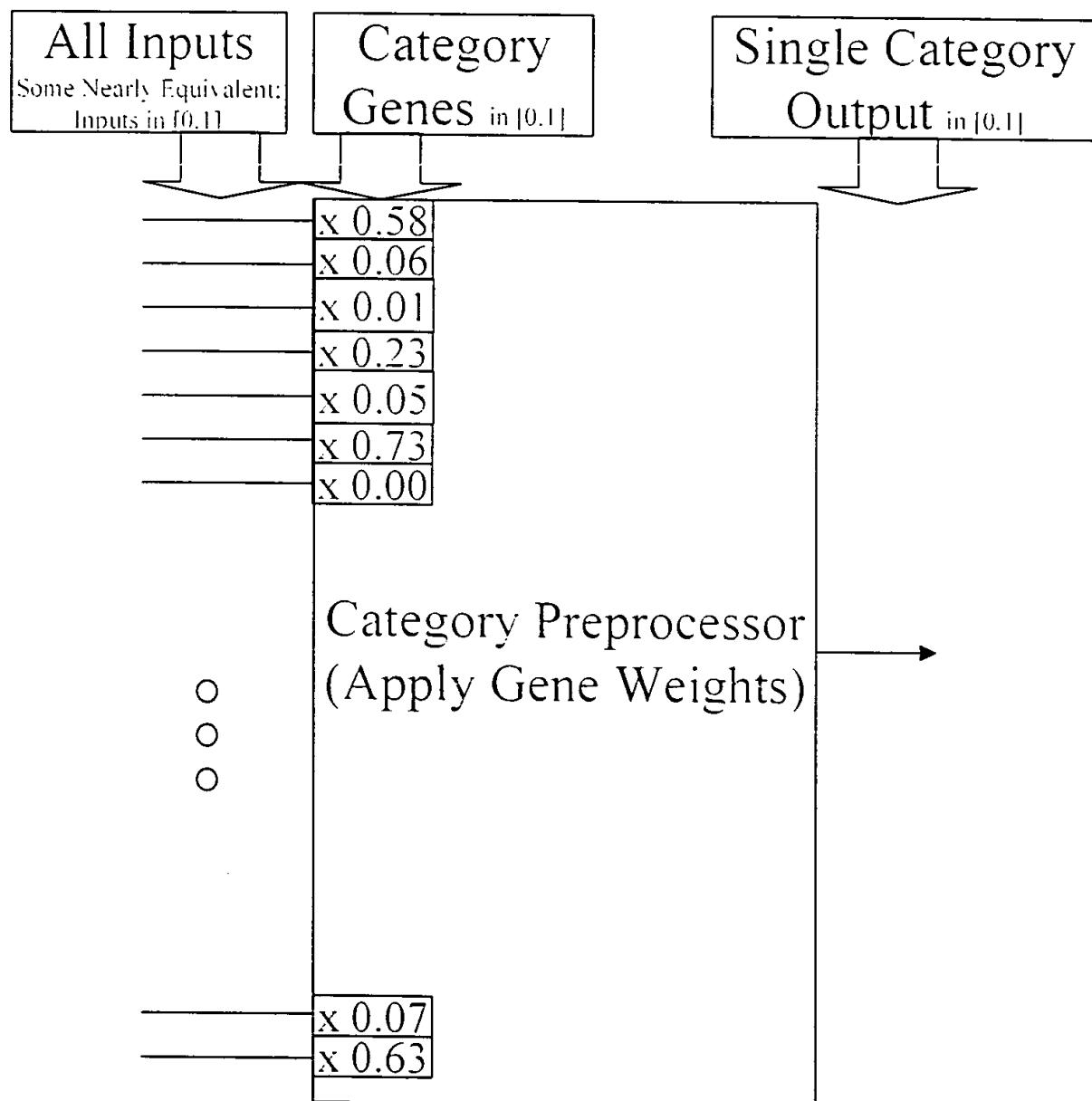


Figure 4C
GA Rolling: Illustration of the Mapping
Used by the Genetic Algorithm

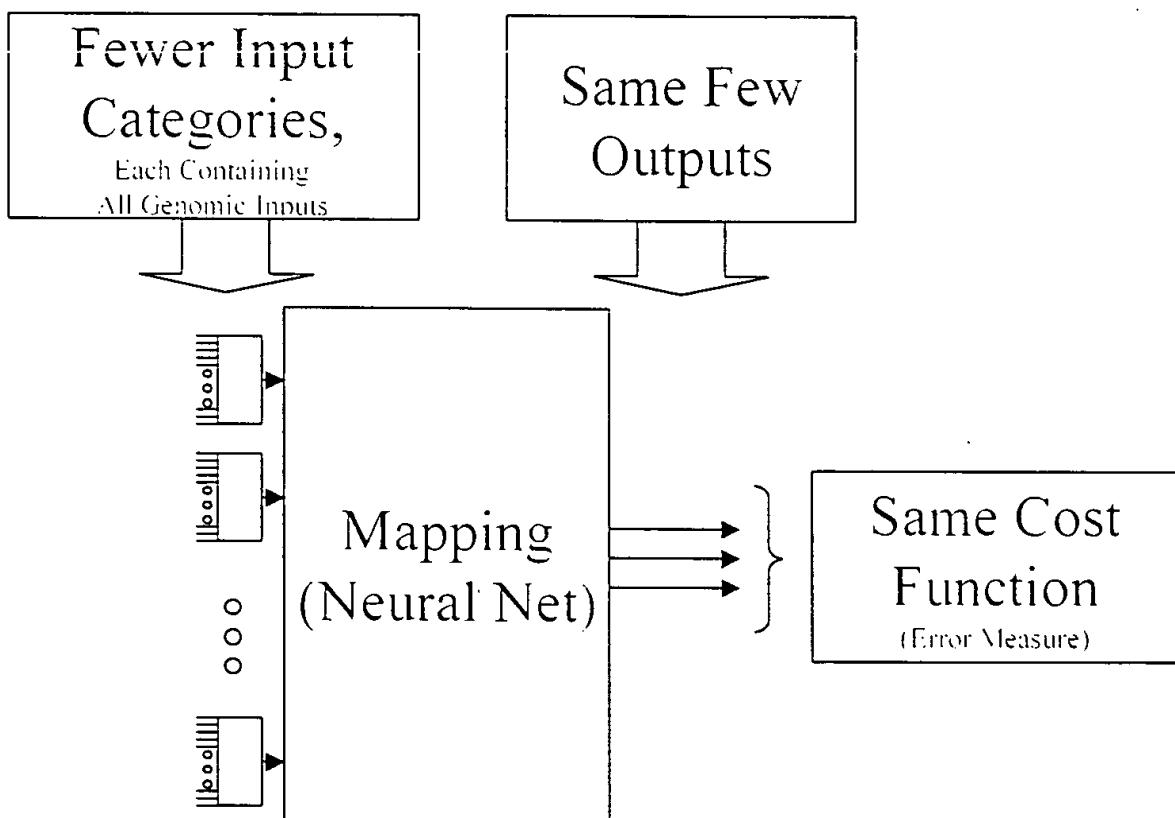


Figure 4D
GA Rolling: Illustration of the Use of the
Genetic Algorithm

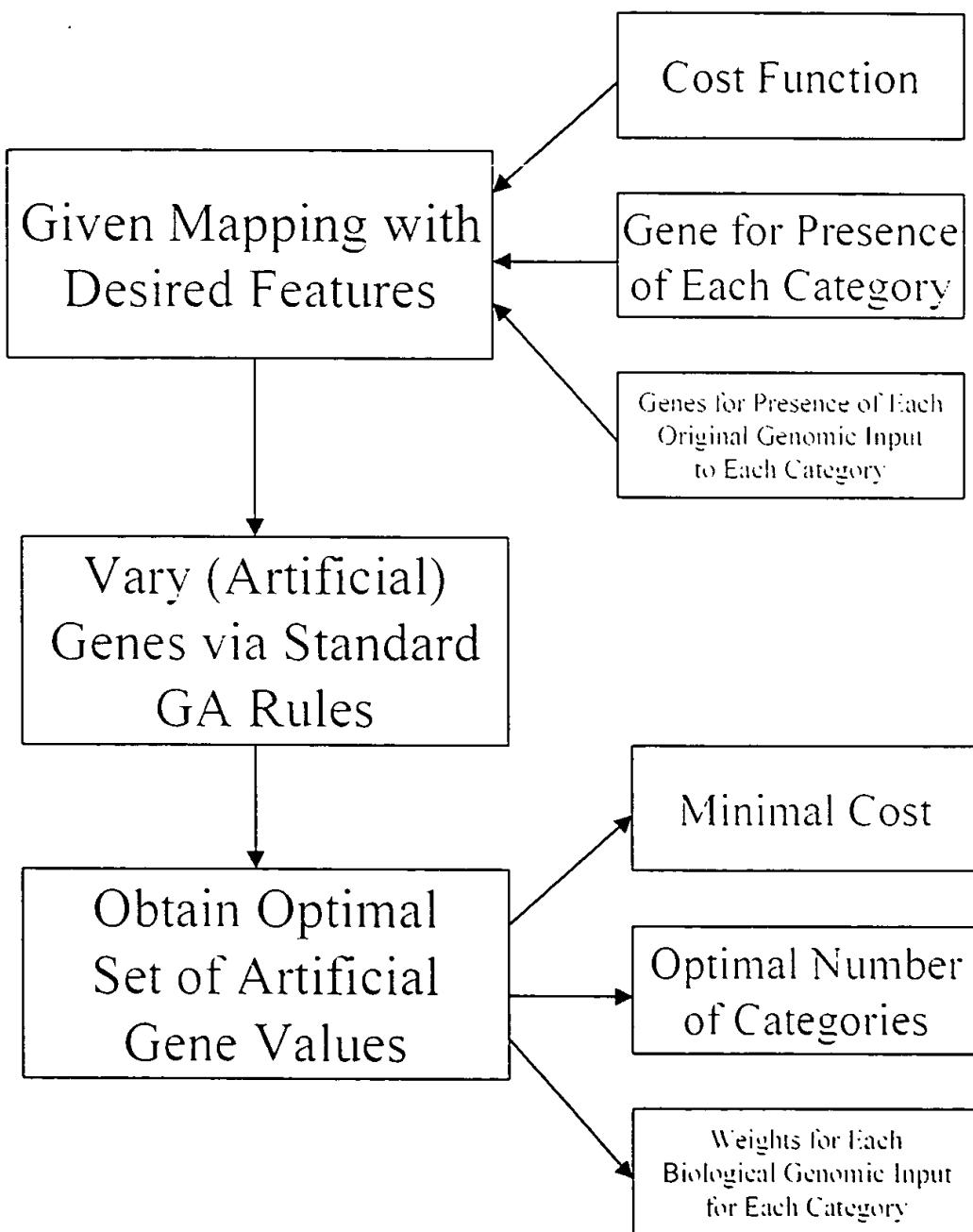


Figure 5A
Use of Functional Genomic Categorizations for
Predicting Drug Interactions:
Preliminary Constructs

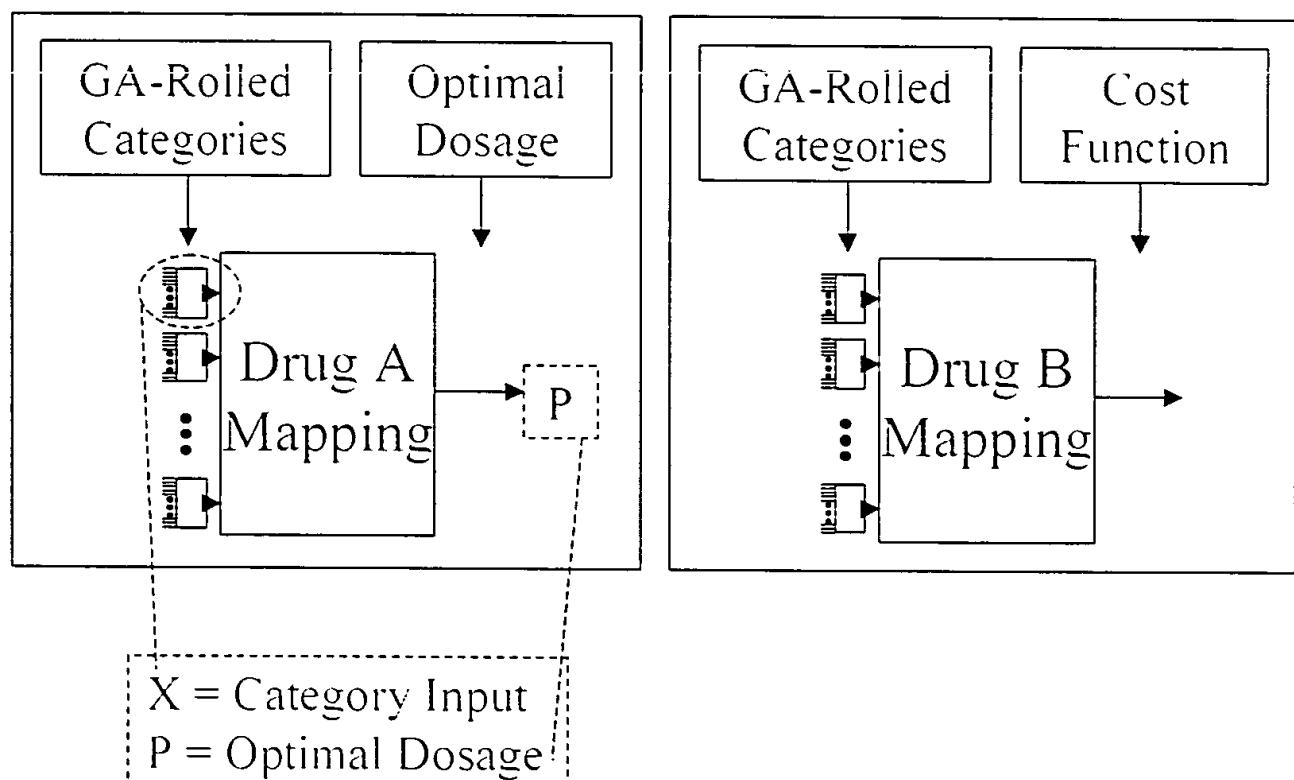


Figure 5B

Use of Functional Genomic Categorizations for Predicting Drug Interactions: Intermediate Calculations

“Equivalence” of optimal drug dosage
and category X:

$$E = -\delta(\ln(P)) / \delta(\ln(X))$$

(Roughly in range [-2,2].)

Estimated equivalent of optimal drug dosage
in units of category X:

$$\delta X_{\text{drug}} \sim E X_{\text{patient}}$$

$(\delta X_{\text{drug}} = \text{Integral}(0, X_{\text{patient}}) E(X') dX')$

Model effect of Drug A on Drug B
with effectively altered genomic inputs
(to Cost B mapping):

$$X = X_{\text{patient}} + \delta X_{\text{drug}}$$

Identify corresponding increases in Cost B
as interactions (of A on B) if cost
increases > e.g. 30%

Figure 6A
Universal Functional Genomic Categorization:
Assembly of Categories

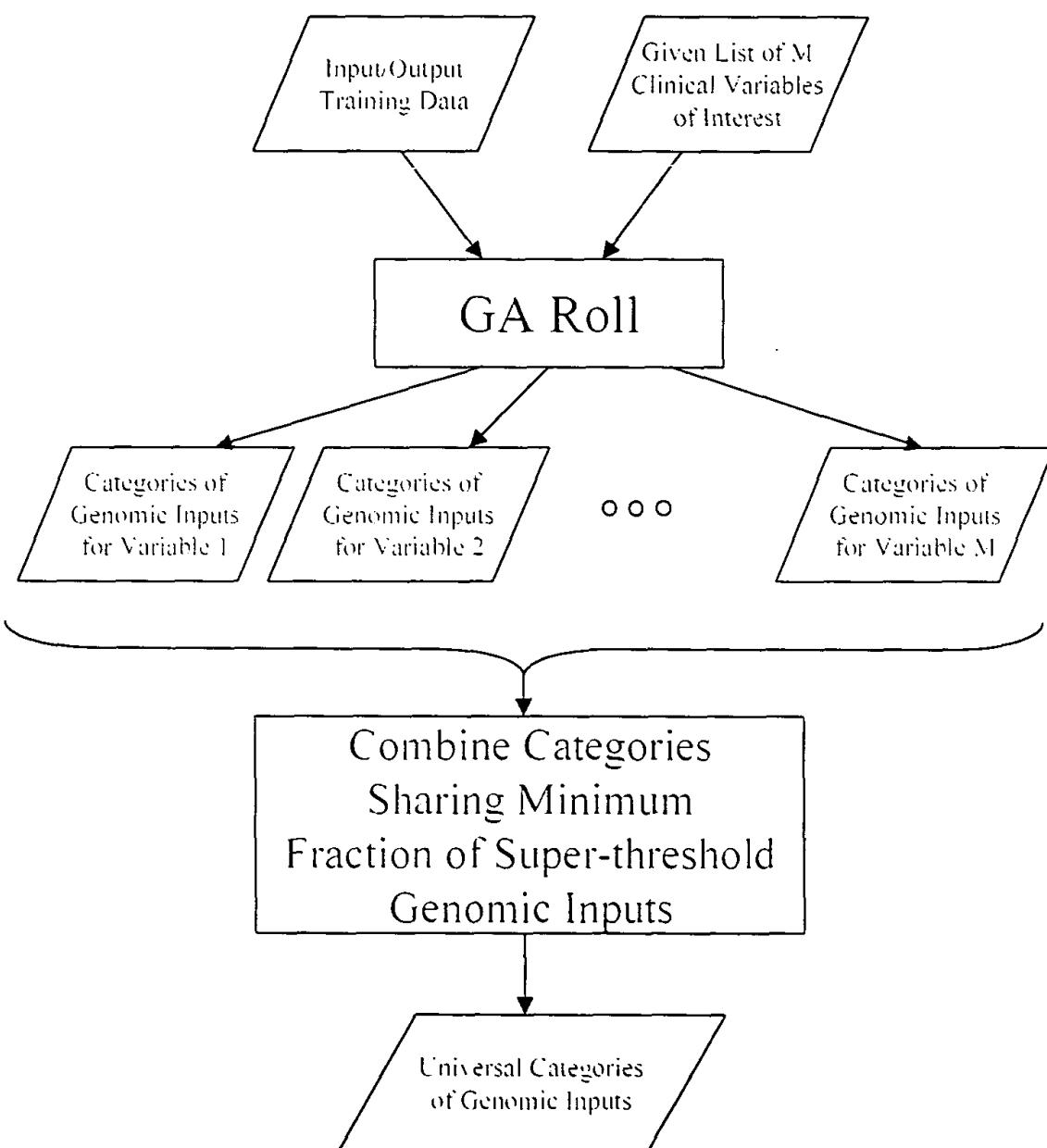


Figure 6B
Universal Functional Genomic Categorization:
Calculation of Probabilities:
Given Information

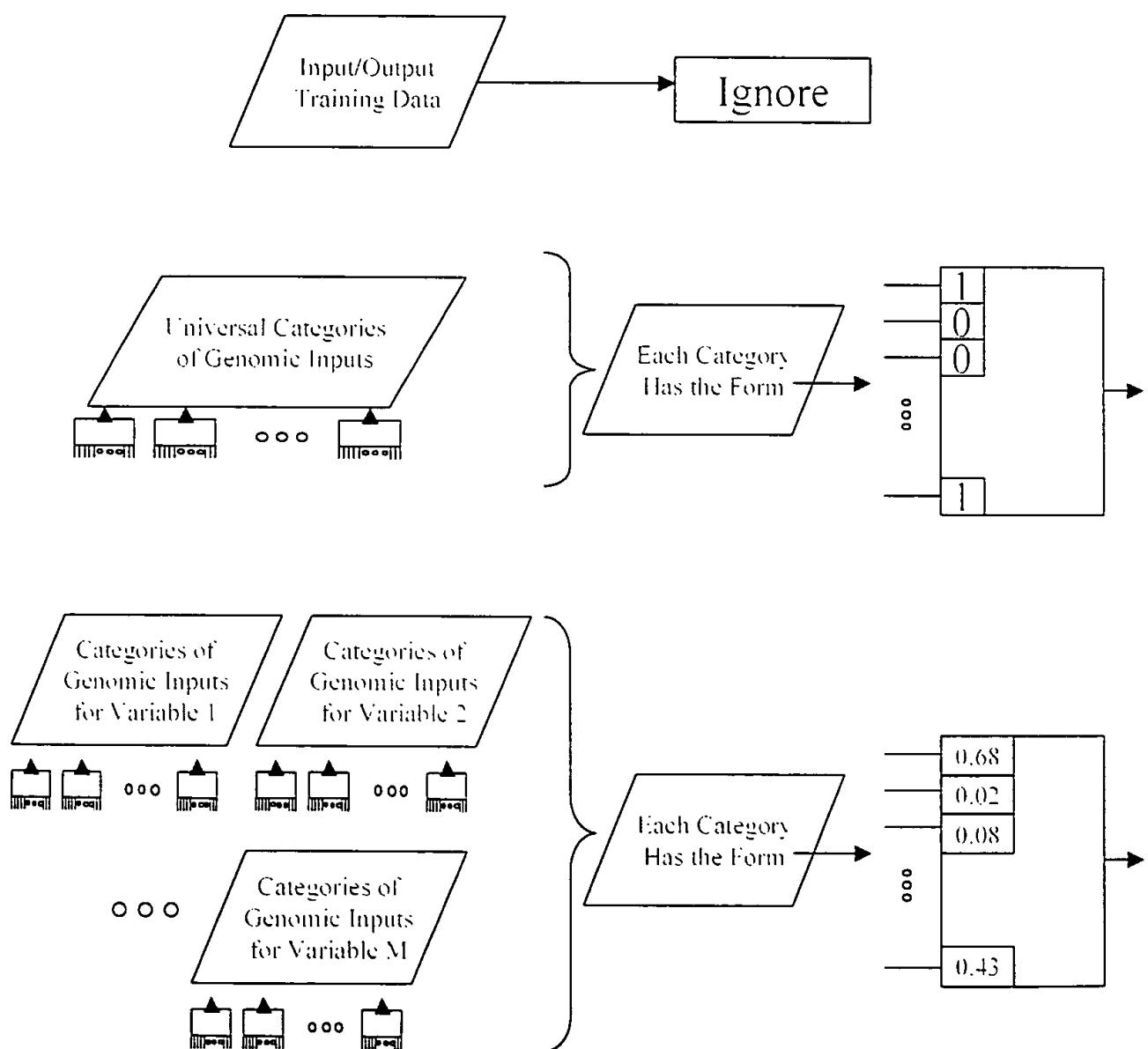


Figure 6C

Universal Functional Genomic Categorization: Calculation of Probabilities: Identification of Data

